

## Rapid Watershed Assessment

### Rainy Headwaters

(MN) HUC: 09030001



# DRAFT

Rapid watershed assessments provide initial estimates of where conservation investments would best address the concerns of landowners, conservation districts, and other community organizations and stakeholders. These assessments help land-owners and local leaders set priorities and determine the best actions to achieve their goals.

## Introduction

The Rainy Headwaters 8-digit Hydrological Unit Code (HUC) Subbasin is located in the Northern Lakes and Forests ecoregion of Northern Minnesota. This watershed is 1,603,763 acres in size. Approximately eighty eight percent of the land is publicly owned.

There are 153 Farms in the watershed. Approximately sixty nine percent of the operations are less than 180 acres in size, thirty percent are 180 to 1,000 acres in size, and existing data indicates one farm equal to or greater than 1,000 acres in size.

Primary resource concerns include Surface water quality, Wetland management, Woodland Management, Management of excessive wetness, and the short growing season.

The watershed occurs within and across the boundaries of St. Louis, Cook, and Lake counties. As with many areas of Northern Minnesota, principal industries include forest products harvesting, manufacturing, mining and tourism.

The greater Rainy River Basin is home to some of Minnesota's finest forest and water resources. Voyageurs National Park and the Boundary Waters Canoe Area Wilderness (BWCA) are located within the Basin, as are several of the state's most famous walleye fisheries and many top-notch trout streams.



### County Totals

<i>County</i>	<i>Acres in HUC</i>	<i>% HUC</i>
St Louis	535,619	33.4%
Cook	204,327	12.7%
Lake	863,635	53.9%
<b>Total acres:</b>	<b>1,603,763</b>	<b>100%</b>

## Physical Description

The Rainy Headwaters watershed includes two Ecological Classification System subsections. The basin is located predominately in the Ecological Classification System's Border Lakes and Laurentian Highlands subsections.

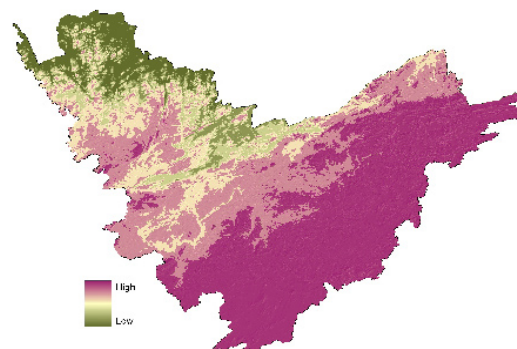
The Rainy Headwaters watershed is the largest watershed in terms of size in the Minnesota portion of the Rainy River Basin.

The Federal Government is the largest landholder in the watershed with seventy five percent of the land. Major Federal lands include the Boundary Waters Canoe Area Wilderness with 739,258 acres, the Superior National Forest at 438,950 acres, as well as Voyagers National Park with 119 acres.

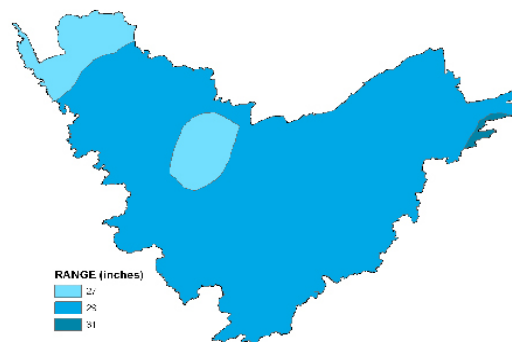
Precipitation in the watershed ranges from 25 to 29 inches annually. Most lands within this watershed are not highly erodible, and soils are often hydric. Much of the land in the subbasin is not suited or poorly suited to agricultural uses.

Development pressure is moderate throughout this subbasin, with occasional lands being parceled out for timber production or recreational uses.

**Relief**

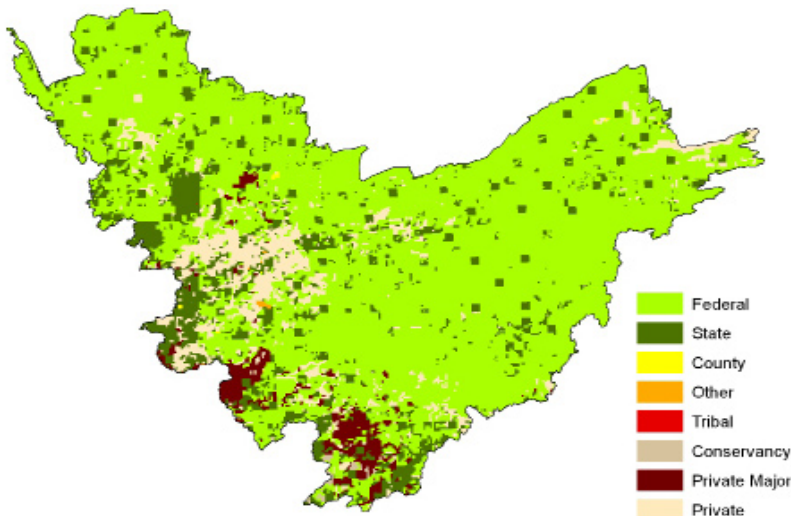


**Average Precipitation (inches)**



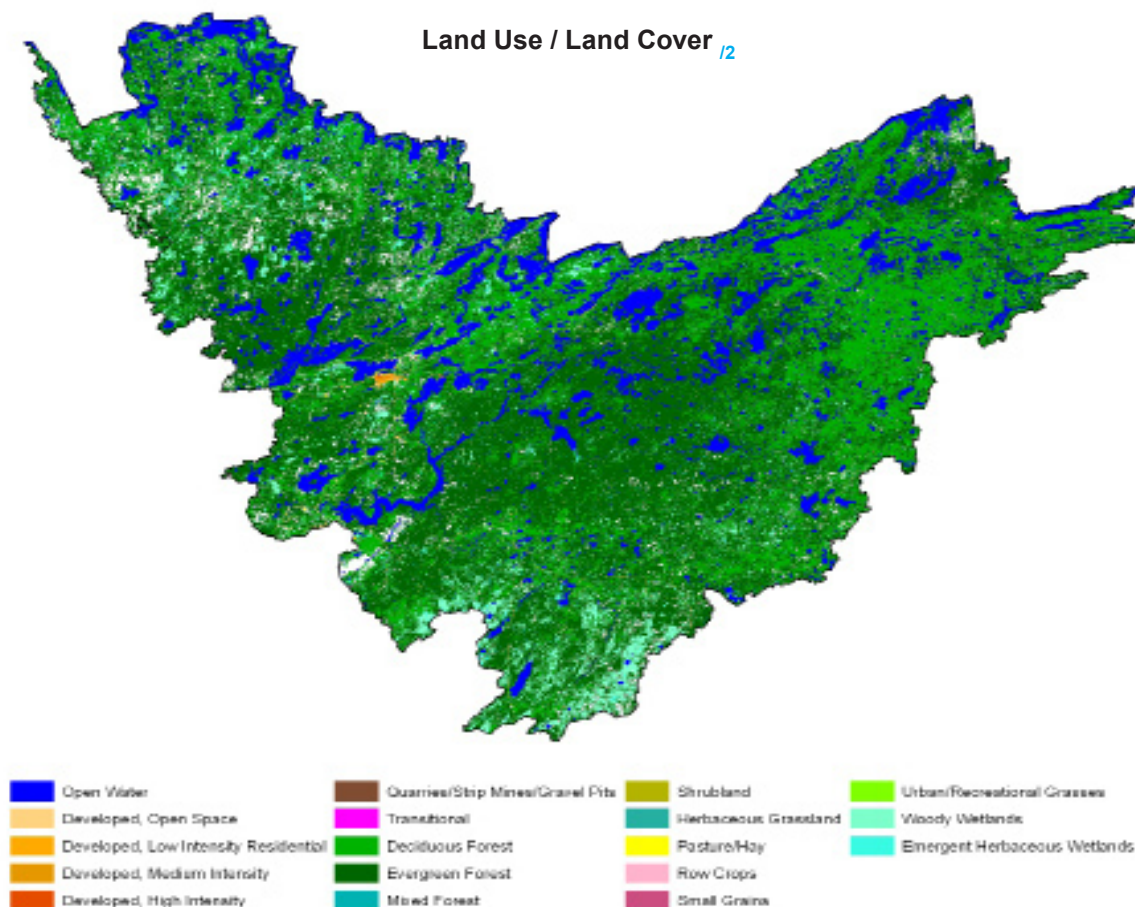
## Ownership

Ownership Type	Acres	% of HUC
Conservancy	3,198	0.2
County	1,149	0.1
Federal	1,209,864	75.4
State	206,331	12.9
Other	923	0.1
Tribal	24	0.002
Private Major	51,010	3.2
<b>Private</b>	<b>131,264</b>	<b>8.2</b>
<b>Total Acres:</b>	<b>1,603,763</b>	<b>100</b>



## Ownership / Land Use

The Rainy Headwaters watershed covers an approximate area of 1,603,763 acres. Slightly more than seventy five percent of the land in the watershed is federally owned (1,209,864 acres). The second largest ownership type is State, with 206,331 acres (12.9%), followed by Private with approximately 131,264 acres (8.2%), Private Major (Corporate) with 51,010 acres (3.2%), Conservancy with 3,198 acres (0.2%), County with 1,149 acres (0.1%), and Miscellaneous "Other Public" lands amounting to 923 acres (0.1%). Tribally owned lands make up the smallest ownership percentage, amounting to 24 Acres. Land use by ownership type is represented in the table below.



## Ownership / Land Use <sup>/3</sup>

	Public		Private**		Tribal			
Landcover/Use	Acres	% Public	Acres	% Private	Acres	% Tribal	Total Acres	Percent
Forest	942,065	58.9%	104,091	6.5%	24	0.0%	1,046,179	65.4%
Grass, etc	4,626	0.3%	1,892	0.1%	0	0.0%	6,518	0.4%
Orchards	0	0.0%	0	0.0%	0	0.0%	0	0.0%
Row Crops	4,576	0.3%	1,855	0.1%	0	0.0%	6,431	0.4%
Shrub etc	13,241	0.8%	6,217	0.4%	0	0.0%	19,459	1.2%
Wetlands	260,566	16.3%	39,819	2.5%	0	0.0%	300,386	18.8%
Residential/Commercial	586	0.0%	1,626	0.1%	0	0.0%	2,212	0.1%
Open Water*	187,765	11.7%	30,268	1.9%	0	0.0%	218,033	13.6%

\* ownership undetermined

\*\* includes private-major

<b>Watershed Totals:</b>	<b>1,413,425</b>	<b>88.38%</b>	<b>185,769</b>	<b>11.6%</b>	<b>24</b>	<b>0.0%</b>	<b>1,603,763</b>	<b>100%</b>
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**Physical Description (continued)**

			cu. ft/sec	
<b>Stream Flow Data</b>	USGS 05127500 Basswood River near Winton, MN	<b>Total Avg.</b>	1372.3	
		<b>May – Sept. Yield</b>	2079.6	
<b>Stream Data<sup>4</sup></b> (*Percent of Total HUC Stream Miles)		<b>ACRES/MILES</b>	<b>PERCENT</b>	
	Total Miles (100K Hydro GIS Layer)	6007	---	
	Total Miles –303d/TMDL Listed Streams	110	0.018%	
<b>Riparian Land Cover/Land Use<sup>5</sup></b> (Based on a 100-foot buffer on both sides of all streams in the 100K Hydro GIS Layer)	Dev/Barren	613	0.15%	
	Fallow	0	0%	
	Forest	201,906	50.1%	
	Grain Crops	0	0%	
	Grass/Pasture	848	0.21%	
	Orchards/Vine	0	0%	
	Row Crops	1675	0.4%	
	Shrub/Range	1645	0.4%	
	Water	125814	31.2%	
	Wetlands	68176	16.9%	
	<b>Total Buffer Acres</b>	<b>403,009</b>	---	
<b>Crop and Pastureland Land Capability Class<sup>6</sup></b> (Croplands & Pasturelands Only) (1997 NRI Estimates for Non-Federal Lands Only)	1 – slight limitations	0	0%	
	2 – moderate limitations	0	0%	
	3 – severe limitations	0	0%	
	4 – very severe limitations	0	0%	
	5 – no erosion hazard, but other limitations		0%	
	6 – severe limitations; unsuitable for cultivation; limited to pasture, range, forest	0	0%	
	7 – very severe limitations; unsuitable for cultivation; limited to grazing, forest, wildlife habitat	0	0%	
	8 – miscellaneous areas; limited to recreation, wildlife habitat, water supply	0	0%	
	<b>Total Crop &amp; Pastureland</b>	<b>0</b>	---	
<b>Irrigated Lands<sup>7</sup></b> (1997 NRI Estimates for Non-Federal Lands Only)	<b>TYPE OF LAND</b>	<b>ACRES</b>	<b>% of Irrigated Lands</b>	<b>% of HUC</b>
	Cultivated Cropland	0	0%	0%
	Uncultivated Cropland	0	0%	0%
	Pastureland	0	0%	0%
	<b>Total Irrigated Lands</b>	<b>0</b>	<b>0%</b>	<b>0%</b>

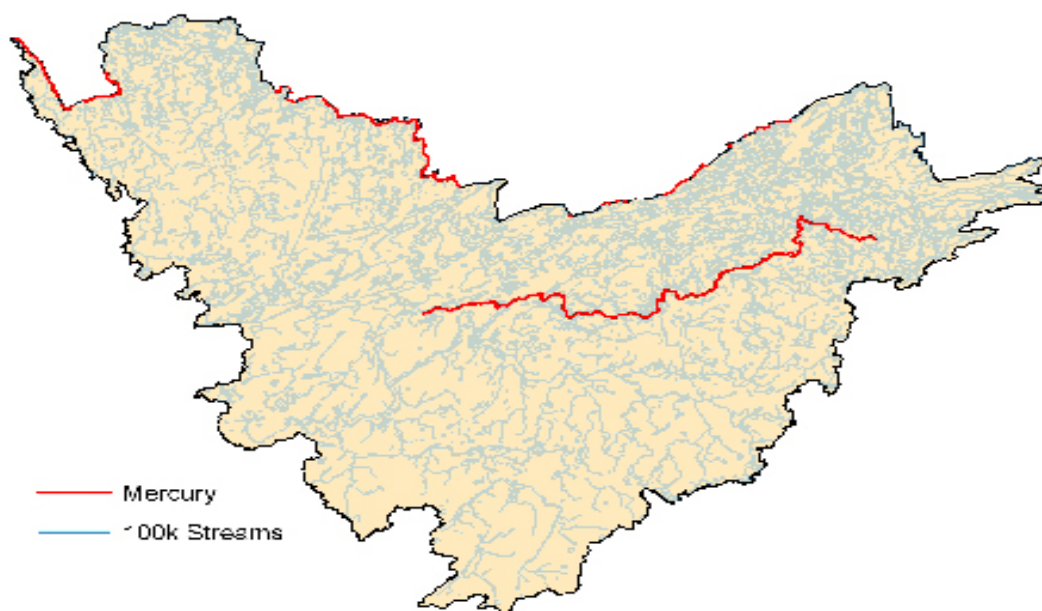


## Assessment of Waters

Section 303(d) of the Clean Water Act states that water bodies with impaired use(s) must be placed on a state's impaired waters list. A water body is "Impaired" or polluted when it fails to meet one or more of the Federal Clean Water Act's water quality standards. Federal Standards exist for basic pollutants such as sediment, bacteria, nutrients, and mercury. The Clean Water Act requires the Minnesota Pollution Control Agency (MPCA) to identify and restore impaired waters.

Minnesota's impaired waters list, updated every two years, identifies assessed waters that do not meet water quality standards. The primary tool for addressing impaired waters is a pollution reduction plan called a Total Maximum Daily Load, or TMDL. After impaired use(s) have been identified, the TMDL process identifies all sources of each pollutant. The plan then determines how much each source must reduce its contribution in order to meet the applicable water quality standard. The Clean Water Act requires a completed TMDL for each water quality violation identified on a state's impaired waters list. Lakes or river reaches with multiple impairments require multiple TMDLs.

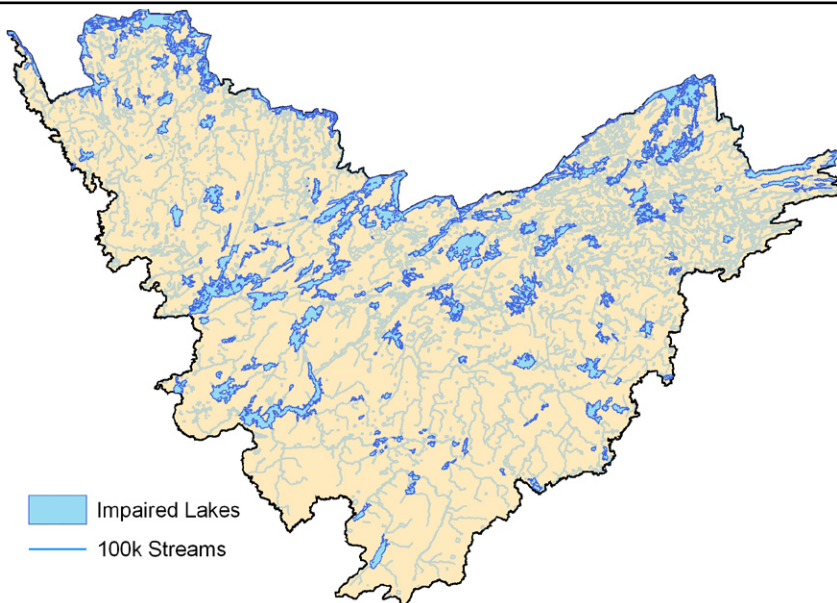
**2006 Minnesota 303d Listed Streams - Rainy Headwaters**



Listed Stream / Reach <sup>/8</sup>	Impairment	Affected Use
Rainy River Saganaga Lk to Basswood Lk	Mercury	Aquatic Consumption
Rainy River Basswood Lk to Crooked Lk	Mercury	Aquatic Consumption
Rainy River Crooked Lk to Iron Lk	Mercury	Aquatic Consumption
Rainy River Iron Lk to Lac La Croix	Mercury	Aquatic Consumption
Rainy River Lac La Croix to Vermilion R	Mercury	Aquatic Consumption
Kawishiwi River Headwaters to S Kawishiwi R	Mercury	Aquatic Consumption
Kawishiwi River S Kawishiwi R to Farm Lk	Mercury	Aquatic Consumption

**Assessment of Waters (continued)**

**2006 Minnesota 303d Listed Lakes - Rainy Headwaters**



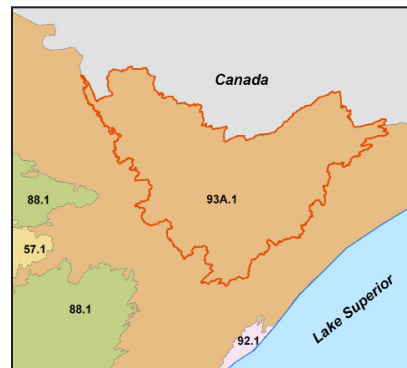
Listed Lake	Impairment	Affected Use	Listed Lake	Impairment	Affected Use
Red Rock	Mercury	Aquatic Consumption	Basswood	Mercury	Aquatic Consumption
Phoebe	Mercury	Aquatic Consumption	Greenwood	Mercury	Aquatic Consumption
Little Saganaga	Mercury	Aquatic Consumption	Middle McDougal	Mercury	Aquatic Consumption
Gabimichigami	Mercury	Aquatic Consumption	South McDougal	Mercury	Aquatic Consumption
Harriet	Mercury	Aquatic Consumption	Dunnigan	Mercury	Aquatic Consumption
Wanless	Mercury	Aquatic Consumption	Slate	Mercury	Aquatic Consumption
Coffee	Mercury	Aquatic Consumption	Swallow	Mercury	Aquatic Consumption
"T"	Mercury	Aquatic Consumption	Pike	Mercury	Aquatic Consumption
Windy	Mercury	Aquatic Consumption	Highlife	Mercury	Aquatic Consumption
Square	Mercury	Aquatic Consumption	East Chub	Mercury	Aquatic Consumption
Watonwan	Mercury	Aquatic Consumption	West Chub	Mercury	Aquatic Consumption
Kawishiwi	Mercury	Aquatic Consumption	North McDougal	Mercury	Aquatic Consumption
Polly	Mercury	Aquatic Consumption	August	Mercury	Aquatic Consumption
Adams	Mercury	Aquatic Consumption	Gabbro	Mercury	Aquatic Consumption
Ogishkemuncie	Mercury	Aquatic Consumption	Nickel	Mercury	Aquatic Consumption
Ottertrack	Mercury	Aquatic Consumption	Section Twelve	Mercury	Aquatic Consumption
Silver Island	Mercury	Aquatic Consumption	Triangle	Mercury	Aquatic Consumption
Perent	Mercury	Aquatic Consumption	Greenstone	Mercury	Aquatic Consumption
Little Knife	Mercury	Aquatic Consumption	Clear	Mercury	Aquatic Consumption
Section 29	Mercury	Aquatic Consumption	Sand	Mercury	Aquatic Consumption
Bunny	Mercury	Aquatic Consumption	Harris	Mercury	Aquatic Consumption
Amber	Mercury	Aquatic Consumption	Beaver Hut	Mercury	Aquatic Consumption
Iron	Mercury	Aquatic Consumption	Pickerel	Mercury	Aquatic Consumption
North	Mercury	Aquatic Consumption	Browns	Mercury	Aquatic Consumption
Mayhew	Mercury	Aquatic Consumption	Garden	Mercury	Aquatic Consumption
West Pope	Mercury	Aquatic Consumption	Newton	Mercury	Aquatic Consumption
Little Iron	Mercury	Aquatic Consumption	Sandpit	Mercury	Aquatic Consumption
Gunflint	Mercury	Aquatic Consumption	Horse	Mercury	Aquatic Consumption
Crab	Mercury	Aquatic Consumption	Cedar	Mercury	Aquatic Consumption

## Common Resource Areas

The Rainy Headwaters Watershed encompasses a single Common Resource Area, CRA 93A.1. <sup>/9</sup>

### 93A.1 Superior Upland Bedrock and Till Complex:

Gently sloping to very steep soils that generally formed in loamy, dense glacial till. Bedrock control is common and outcrops in many places, especially in the Boundary Water area. Bogs are common, both dysic and euic in reaction. Deciduous and coniferous forestland is the main land use. Small areas of cropland, pasture and hayland occur. Resource concerns are timber harvest management, wildlife habitat management, forage production, and riparian management.



Only the major CRA units are described above.
   
 For further information, go to:
   
<http://soils.usda.gov/survey/geography/cra.html>

## Soils / Geology

Soil distribution and bedrock geology in the Rainy Headwaters subbasin varies regionally and is most easily summarized according to ecological classification system subsection descriptions.

**Border Lakes:** The soils are derived from a mantle of acid, cobbly, and gravelly glacial till of variable depth. Coarse-loamy to coarse soil textures are most common. There are small areas of sandy and clayey lacustrine soil in the western portion of the subsection. About 5 percent of the unit is occupied by organic soils. The soils are classified as Ochrepts, with localized Aquepts and Hemists (Anderson and Grigal 1984).

Thin glacial drift covers much of the subsection, and bedrock exposures are common (Department of Soil Science, University of Minnesota 1981b). The subsection has Precambrian-age (Late Archean and Early Proterozoic) bedrock, including gneiss, undifferentiated granite, and metamorphosed mafic to intermediate volcanic and sedimentary rocks (Sims et al. 1970c, Morey 1976).

**Laurentian Highlands:** Soils on the upland portions of the drumlin field are well drained gravelly, sandy loams. Between the drumlins are narrow to broad depressions with very poorly drained soils. Almost 90 percent of the soils in the outwash plain are excessively drained sands; the remainder are very poorly drained. Soils of the drumlin fields are classified as Ochrepts, Aquepts, and Hemists, whereas those of the outwash are Orthents, Orthods, Ochrepts, and Psammets (Cummins and Grigal 1981).

Glacial drift thickness over bedrock is generally less than 100 feet, and there are localized outcrops of bedrock, especially along the eastern edge of the subsection (Olsen and Mossler 1982). All of the bedrock underlying this unit is Precambrian in age. In the north, Keweenaw bedrock includes sandstone, arkose, shale, basaltic to rhyolitic lava flows and pyroclastic rocks, gabbro, troctolite, ferrogabbro, anorthosite, and peridotite (Morey 1976, Morey et al. 1982). To the south, Upper Precambrian quartzite is extensive (Albert 1993).



## Drainage Classification

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Drainage class (natural) refers to the frequency and duration of wet periods under conditions similar to those under which the soil formed. Alterations of the water regime by human activities, either through drainage or irrigation, are not a consideration unless they have significantly changed the morphology of the soil.

Seven classes of natural soil drainage are recognized—excessively drained, somewhat excessively drained, well drained, moderately well drained, somewhat poorly drained, poorly drained, and very poorly drained. These classes are defined in the “Soil Survey Manual.”



Visit the online Web Soil Survey at  
<http://websoilsurvey.nrcs.usda.gov> for official and  
current USDA soil information as viewable maps and  
tables. Visit the Soil Data Mart at  
<http://soildatamart.usda.gov> to download SSURGO  
certified soil tabular and spatial data.

## Farmland Classification

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Farmland classification identifies map units as prime farmland, farmland of statewide importance, farmland of local importance, or unique farmland.

Farmland classification identifies the location and extent of the most suitable land for producing food, feed, fiber, forage, and oilseed crops.

NRCS policy and procedures on prime and unique farmlands are published in the Federal Register, Vol. 43, No 21, January 31, 1978.



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## Hydric Soils

This rating provides an indication of the proportion of the map unit that meets criteria for hydric soils. Map units that are dominantly made up of hydric soils may have small areas, or inclusions of nonhydric soils in the higher positions on the landform. Map units of dominantly non-hydric soils may therefore have inclusions of hydric soils in the lower positions on the landform.

Hydric soils are defined by the National Technical Committee for Hydric Soils (NTCHS) as “soils that formed under conditions of saturation, flooding, or ponding long enough during the growing season to develop anaerobic conditions in the upper part” (Federal Register 1994). These soils, under natural conditions, are either saturated or inundated long enough during the growing season to support the growth and reproduction of hydrophytic vegetation.



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## Highly Erodible Land (HEL)

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The erodibility index (EI) for a soil map unit is determined by dividing the potential erodibility for the soil map unit by the soil loss tolerance (T) value established for the soil in the FOTG as of January 1, 1990.

A soil map unit with an Etof 8 or greater is considered to be highly erodible land (HEL).

Potential erodibility is based on default values for rainfall amount and intensity, percent and length of slope, surface texture and organic matter, permeability, and plant cover. Actual erodibility and EI for any specific map unit depends on the actual values for these properties.



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## Land Capability Classification

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Land capability classification shows, in a general way, the suitability of soils for most kinds of field crops. Crops that require special management are excluded. The soils are grouped according to their limitations for field crops, the risk of damage if they are used for crops, and the way they respond to management.

The criteria used in grouping the soils does not include major and generally expensive land forming that would change slope, depth, or other characteristics of the soils, nor do they include possible but unlikely major reclamation projects. Capability classification is not a substitute for interpretations designed to show suitability and limitations of groups of soils for rangeland, for forestland, or for engineering purposes.



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## THREATENED AND ENDANGERED SPECIES <sup>14</sup>

NRCS assists in the conservation of threatened and endangered species and avoids or prevents activities detrimental to such species. NRCS' concern for these species includes the species listed by the Secretary of the Interior (as published in the Federal Register) and species designated by state agencies. The following is a list of threatened, endangered, candidate species and species of special concern that occur in the basin.



Scientific Name	Common Name	Type	Scientific Name	Common Name	Type
<i>Acipenser fulvescens</i>	Lake Sturgeon	Vertebrate Animal	<i>Ichthyomyzon fossor</i>	Northern Brook Lamprey	Vertebrate Animal
<i>Agrostis geminata</i>	Twin Bentgrass	Vascular Plant	<i>Juncus stygius</i> var. <i>americanus</i>	Bog Rush	Vascular Plant
<i>Asplenium trichomanes</i>	Maidenhair Spleenwort	Vascular Plant	<i>Juniperus horizontalis</i>	Creeping Juniper	Vascular Plant
<i>Astragalus alpinus</i>	Alpine Milk-vetch	Vascular Plant	<i>Lasmigona compressa</i>	Creek Heelsplitter	Invertebrate Animal
<i>Botrychium minganense</i>	Mingan Moonwort	Vascular Plant	<i>Listera auriculata</i>	Auricled Twayblade	Vascular Plant
<i>Botrychium oneidense</i>	Blunt-lobed Grapefern	Vascular Plant	<i>Littorella uniflora</i>	American Shore-plantain	Vascular Plant
<i>Botrychium pallidum</i>	Pale Moonwort	Vascular Plant	<i>Lobaria quercizans</i>	Smooth lungwort	Fungus
<i>Botrychium rugulosum</i>	St. Lawrence Grapefern	Vascular Plant	<i>Luzula parviflora</i> ssp. <i>melanocarpa</i>	Small-flowered Woodrush	Vascular Plant
<i>Botrychium simplex</i>	Least Moonwort	Vascular Plant	<i>Lycaeides idas nabokovi</i>	Nabokov's Blue	Invertebrate Animal
<i>Calamagrostis lacustris</i>	Marsh Reedgrass	Vascular Plant	<i>Moehringia macrophylla</i>	Large-leaved Sandwort	Vascular Plant
<i>Callitriche heterophylla</i>	Larger Water-starwort	Vascular Plant	<i>Muhlenbergia uniflora</i>	One Flowered Muhly	Vascular Plant
<i>Caloplaca parvula</i>	A Species of Lichen	Fungus	<i>Nymphaea leibergii</i>	Small White Water-lily	Vascular Plant
<i>Carex exilis</i>	Coastal Sedge	Vascular Plant	<i>Phacelia franklinii</i>	Franklin's Phacelia	Vascular Plant
<i>Carex flava</i>	Yellow Sedge	Vascular Plant	<i>Phenacomys intermedius</i>	Heather Vole	Vertebrate Animal
<i>Carex katahdinensis</i>	Katahdin Sedge	Vascular Plant	<i>Platanthera clavellata</i>	Club-spur Orchid	Vascular Plant
<i>Carex michauxiana</i>	Michaux's Sedge	Vascular Plant	<i>Potamogeton diversifolius</i>	Diverse-leaved Pondweed	Vascular Plant
<i>Carex praticola</i>	Prairie Sedge	Vascular Plant	<i>Potamogeton vaseyi</i>	Vasey's Pondweed	Vascular Plant
<i>Cetraria aurescens</i>	Eastern candlewax lichen	Fungus	<i>Pseudocyphellaria crocata</i>	Yellow specklebelly	Fungus
<i>Cicindela denikei</i>	Laurentian Tiger Beetle	Invertebrate Animal	<i>Pyrola minor</i>	Small Shinleaf	Vascular Plant
<i>Cladium mariscoides</i>	Twig-rush	Vascular Plant	<i>Ranunculus lapponicus</i>	Lapland Buttercup	Vascular Plant
<i>Cladonia pseudorangiformis</i>	A Species of Lichen	Fungus	<i>Rhynchospora fusca</i>	Sooty-colored Beak-rush	Vascular Plant
<i>Claytonia caroliniana</i>	Carolina Spring-beauty	Vascular Plant	<i>Rubus chamaemorus</i>	Cloudberry	Vascular Plant
<i>Coregonus zenithicus</i>	Shortjaw Cisco	Vertebrate Animal	<i>Saxifraga paniculata</i>	Encrusted Saxifrage	Vascular Plant
<i>Cypripedium arietinum</i>	Ram's-head Lady's-slipper	Vascular Plant	<i>Sorex fumeus</i>	Smoky Shrew	Vertebrate Animal
<i>Drosera anglica</i>	English Sundew	Vascular Plant	<i>Sparganium glomeratum</i>	Clustered Bur-reed	Vascular Plant
<i>Drosera linearis</i>	Linear-leaved Sundew	Vascular Plant	<i>Sticta fuliginosa</i>	Peppered moon lichen	Fungus
<i>Eleocharis nitida</i>	Neat Spike-rush	Vascular Plant	<i>Subularia aquatica</i>	Awlwort	Vascular Plant
<i>Eleocharis quinqueflora</i>	Few-flowered Spike-rush	Vascular Plant	<i>Tomenthypnum falcifolium</i>	Curved-leaved golden moss	Nonvascular Plant
<i>Emydoidea blandingii</i>	Blanding's Turtle	Vertebrate Animal	<i>Torreyochloa pallida</i>	Torrey's Manna-grass	Vascular Plant
<i>Erebia disa mancinus</i>	Disa Alpine	Invertebrate Animal	<i>Utricularia resupinata</i>	Lavendar Bladderwort	Vascular Plant
<i>Falco peregrinus</i>	Peregrine Falcon	Vertebrate Animal	<i>Viola lanceolata</i>	Lance-leaved Violet	Vascular Plant
<i>Fimbristylis autumnalis</i>	Autumn Fimbristylis	Vascular Plant	<i>Waldsteinia fragarioides</i>	Barren Strawberry	Vascular Plant

## RESOURCE CONCERNS

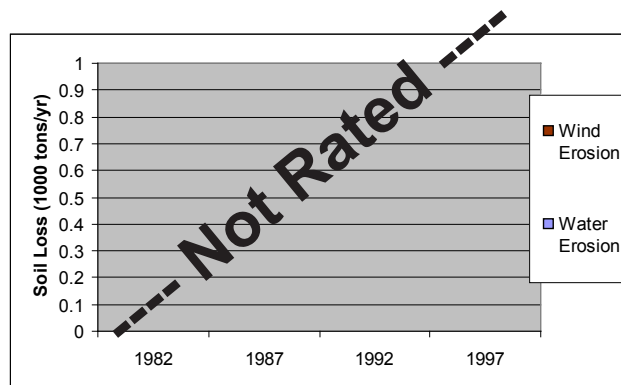
County Soil and Water Conservation Districts have identified the following concerns as top priorities for conservation and cost sharing efforts in the watershed:

- **Surface Water Quality:** Enhancement of surface waters. Reduction of priority pollutants and sediments in surface waters will enhance economic development opportunities by preserving the environmental features that promote and attract tourists and fishermen to the area and improve the quality of water supply in the region.
- **Wetland Management:** Natural wetland protection, wetland creation and restoration; and wetland construction for water quality improvement. Establishing high priority wetland areas and enforcing future wetlands legislation to take advantage of opportunities to enhance the wetland resources of the watershed will ensure the vitality of the resources and natural communities of the basin.
- **Woodland Management:** Priorities include preventing, mitigating, or controlling diseases and pests on public and private forest lands, planting trees or shrubs, restoring prairies, timber stand improvement, timber sales, enhancing wildlife habitat, prescribed burning, and many other practices or projects.
- **Implementation and management of a geographic information system and geologic atlas** for counties in the region. A comprehensive database will enable expedient decisions in resource management, protection, and area planning.
- **Management of Excessive Wetness:** Hydric nature of much of the basin's soils limits productivity and viability of land for agricultural and some silvicultural uses. Efforts such as tiling, species selection, critical planting, and wetland mitigation aid in combating the wetness common to much of the area.
- **Short Growing Season:** Given the short growing season, timely planting, management of moisture, and appropriate seed selection is crucial for a successful crop. Planting delay and short-time concentrated precipitation in the growth season are the main causes of yield reduction.



## NRI Erosion Estimates <sup>/13</sup>

- NRI Estimates for wind erosion and sheet and rill erosion are not available at the 8-digit HUC level for this sub-basin.



## Socioeconomic and Agricultural Data (Relevant)

The Rainy Headwaters subbasin has an estimated population of just under 8,000 people. Median household income throughout the district is approximately \$34,675 yearly, roughly 75% of the national average. Unemployment in the basin is estimated at 4.1%, and approximately 9% of the residents in the watershed are below the national poverty level.

There are 153 Farms in the watershed. Approximately sixty nine percent of the operations are less than 180 acres in size, thirty percent are 180 to 1,000 acres in size, and existing data indicates one farm equal to or greater than 1,000 acres in size. Of the 146 operators in the basin, 52 percent are full-time producers not reliant on off-farm income.



<b>(MN) HUC# 09030001</b>		<b>Total Acres:</b>	<b>1,603,763</b>
<b>Population Data*</b>	Watershed Population	7,990	
	Unemployment Rate	4.1%	
	Median Household Income	34,674	
	% below poverty level	9%	
	Median Value of Home	77,165	
<b>Farms</b>	# of Farms	153	
	# of Operators	146	<b>Percent</b>
	# of Full Time Operators	76	52%
	# of Part Time Operators	70	48%
	<b>Total Crop/Pasturelands:</b>	<b>12,950</b>	<b>0.81%</b>
<b>Farm Size</b>	1 to 49 Acres	41	27%
	50 to 179 Acres	65	42%
	180 to 499 Acres	38	25%
	500 to 999 Acres	8	5%
	1,000 Acres or more	1	1%
<b>Livestock &amp; Poultry</b>	Cattle - Beef	385	57%
	Cattle - Dairy	262	39%
	Chicken	3	0%
	Swine	7	1%
	Turkey	0	0%
	Other	15	2%
	<b>Animal Count Total:</b>	<b>672</b>	
<b>Chemicals (Acres Applied)</b>	<b>Total Permitted AFOs:</b>	<b>7</b>	
	Insecticides	0	
	Herbicides	163	
	Wormicides	0	
	Fruiticides	4	
	<b>Total Acres Treated</b>	<b>169</b>	
	<b>% State Chemical Totals</b>	<b>&gt;0.01%</b>	

## Watershed Projects, Plans and Monitoring

- Long-term water quality monitoring in the Greater Rainy River Watershed. The Northeast Region Sustainable Development Partnership joined with the Minnesota DNR and seven partners in both Canada and the United States to support water quality monitoring and environmental education involving an interagency, inter-scholastic and international cooperation. Koochiching County Environmental Services is the project coordinator. The sponsoring entity was the Rainy / Rapid River Board
- Tomorrow's Habitat for the Wild and Rare: An Action Plan for Minnesota Wildlife , Minnesota DNR. Study outlining 67 Species in Greatest Conservation Need (SGCN). Though occurring in an adjacent area, the Study provides suggestions on priority conservation actions to maintain, enhance, and protect the key habitats for the SGCN's occurring within the region.
- Rainy River Management Plan, St. Louis County, MPCA. a comprehensive river initiative for northern Minnesota concentrating on the historic preservation and riparian restoration of the Rainy River. Plan seeks to balance needs in the watershed as they relate to wetlands, tourism, zoning, roads, river access and the mix of government authority.
- Minntac Water Inventory Reduction EIS, Minntac, MPCA. The objective is to determine how potential changes in surface water hydrology and water quality may affect aquatic organisms and communities in St. Louis County, Minnesota impacted by discharge from the Minntac tailings basin. Considers the impacts on state and federal threatened and endangered aquatic invertebrate species, and other sensitive invertebrate species of concern within the Dark River, Sturgeon River, and Little Fork River drainage, and the Sandy River and Pike River drainage into and including Lake Vermilion.
- Rainy River Plan (Implementation), MPCA and International Joint Commission. Goals may include delineation of specific stream segments to be restored or protected, loading reductions to be achieved, type and amount of habitat to be restored, identification of water management issues and problems, conservation district goals, priority issues and waters, and coordination of citizen monitoring programs and efforts.
- Bois Forte Nett Lake Restoration Project, Phase I. Phase I of the Nett Lake Restoration Program involves the physical removal of rooted emergent plant communities and restoration of opportunity space for wild rice re-colonization. This is a stabilizing measure, intended to stop or reduce the rate of wild rice production decline. Phase II of the program will be implemented starting in 2006. This phase will include more intensive land management actions to reduce beaver impoundment and stagnancy.



## Conservation Districts, Organizations & Partners

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|---|---|
| <ul style="list-style-type: none"> <li>• <b>Bois Forte Department of Natural Resources</b><br/>5344 Lakeshore Drive Nett Lake, MN 55772<br/>Phone: 218-757-3261</li> </ul>    | <ul style="list-style-type: none"> <li>• <b>Sportsmen's Club of Lake Vermilion</b><br/>P.O. Box 456 Cook, MN 55723<br/><a href="http://www.lakevermillion.com/SCLV/index.html">http://www.lakevermillion.com/SCLV/index.html</a></li> </ul> |
| <ul style="list-style-type: none"> <li>• <b>Cook County SWCD</b><br/>411 W 2nd St, Grand Marais, MN 55604<br/>Phone (218) 387-3647</li> </ul>                                 | <ul style="list-style-type: none"> <li>• <b>North St. Louis County SWCD</b><br/>307 1st St. S. Suite 114 Virginia MN 55792<br/>Phone 218-742-9504</li> </ul>  |
| <ul style="list-style-type: none"> <li>• <b>Iron Range Resources</b><br/>4261 Hwy 53 South Eveleth, MN 55734-0441<br/>Phone 218-744-7400</li> </ul>                           | <ul style="list-style-type: none"> <li>• <b>South St. Louis County SWCD</b><br/>215 North 1st Avenue East, # 301, Duluth, MN 55802<br/>Phone 218-723-4867</li> </ul>  |
| <ul style="list-style-type: none"> <li>• <b>Lake County SWCD</b><br/>601 3rd Ave, PO Box 14, Two Harbors, MN 55616<br/>Phone (218) 834-8370</li> </ul>                        | <ul style="list-style-type: none"> <li>• <b>Rainy River First Nations</b><br/>Box 450 Emo, ON P0W 1E0<br/>Phone 807-482-2479 Fax: (807) 482-2603</li> </ul>   |
| <ul style="list-style-type: none"> <li>• <b>Natural Resources Research Institute</b><br/>5013 Miller Trunk Highway Duluth, MN 55811<br/>Phone 218-720-4294</li> </ul>         | <ul style="list-style-type: none"> <li>• <b>Rainy River Basin Water Resources Center</b><br/>1501 Highway 71 International Falls, MN 56649<br/>Phone 218-285-2218</li> </ul>  |
| <ul style="list-style-type: none"> <li>• <b>MPCA Regional Office - Duluth</b><br/>525 Lake Avenue S. # 400 Duluth, MN 55802<br/>Phone 218-723-4660 or 800-657-3864</li> </ul> | <ul style="list-style-type: none"> <li>• <b>International Joint Commission Great Lakes Office</b><br/>100 Ouellette Ave., 8th Floor Windsor, ON N9A 6T3<br/>Phone: 519-257-6733</li> </ul>  |

## Footnotes / Bibliography

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1. Ownership Layer – Source: MN Stewardship Data: Minnesota Department of Natural Resources, Section of Wildlife, BRW, Inc, 2007. This is the complete GAP Stewardship database containing land ownership information for the entire state of Minnesota. Date of source material is variable and ranges from 1976 to 2007, although a date range of 1983 to 1985 predominates. Land interest is expressed only when some organization owns or administers more than 50% of a forty except where DNR could create sub-forty accuracy polygons.
2. National Land Cover Dataset (NLCD) - Originator: U.S. Geological Survey (USGS); Publication date: 20010631; Title: Minnesota Land Cover Data Set, Edition: 1; Geospatial data presentation form: Raster digital data; Publisher: U.S. Geological Survey, Sioux Falls, SD, USA.
3. Ownership layer classes grouped to calculate Public ownership vs. Private and Tribal ownership by Minnesota NRCS Rapid Watershed Assessment Staff. Land cover / Land use data was then extracted from the National Landcover Dataset Classification System and related to ownership class polygons.
4. U.S. Geological Survey National Hydrography Dataset (NHD) 1:100,000-scale Digital Line Graph (DLG) medium resolution hydrography data, integrated with reach-related information from the U.S. Environmental Protection Agency Reach File Version 3.0 (RF3). The Hydro 100k layer was compared to MPCA's 303(d) data to derive percentage of listed waters.
5. Land Cover / Land Use / Hydro 100k Buffer. Using the 100k Hydrology dataset, All streams within HUC were spatially buffered to a distance of 100 ft. National Landcover Dataset attributes were extracted for the spatial buffer to demonstrate the vegetation and landuse in vulnerable areas adjacent to waterways.
6. Land Capability Class. ESTIMATES FROM THE 1997 NRI DATABASE (REVISED DECEMBER 2000) REPLACE ALL PREVIOUS REPORTS AND ESTIMATES. Comparisons made using data published for the 1982, 1987, or 1992 NRI may produce erroneous results. This is because of changes in statistical estimation protocols and because all data collected prior to 1997 were simultaneously reviewed (edited) as 1997 NRI data were collected. All definitions are available in the glossary. In addition, this December 2000 revision of the 1997 NRI data updates information released in December 1999 and corrects a computer error discovered in March 2000. For more information: <http://www.nrcs.usda.gov/technical/NRI/>
7. 1997 NRI Irrigated Land Estimates. Irrigated land: Land that shows evidence of being irrigated during the year of the inventory or during two or more years out of the last four years. Water is supplied to crops by ditches, pipes, or other conduits. Water spreading is not considered irrigation; it is recorded as a conservation practice. [NRI-97] For more information: <http://www.nrcs.usda.gov/technical/NRI/>
8. 303(d) Stream data. Minnesota's Final Impaired Waters (per Section 303(d) Clean Water Act), 2006. Data obtained from Minnesota Pollution Control Agency (MPCA). The Minnesota Pollution Control Agency (MPCA) helps protect state water by monitoring quality, setting standards and controlling inputs through the development of TMDL plans. <http://www.pca.state.mn.us/water/tmdl/index.html#maps>.



## Footnotes / Bibliography (continued)

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9. National Coordinated Common Resource Area (CRA) Geographic Database. A Common Resource Area (CRA) map delineation is defined as a geographical area where resource concerns, problems, or treatment needs are similar. It is considered a subdivision of an existing Major Land Resource Area (MLRA) map delineation or polygon. Landscape conditions, soil, climate, human considerations, and other natural resource information are used to determine the geographic boundaries of a Common Resource Area

10. Soil Survey Geographic Database (SSURGO) Tabular and spatial data obtained from NRCS Soil Data Mart at <http://soildatamart.nrcs.gov>. Publication dates vary by county. Component and layer tables were linked to the spatial data via SDV 5.1 and ARCGIS 9.1 to derive the soil classifications presented in these examples. Highly Erodible Land Classification Data obtained from USDA/NRCS EFOTG Section II, County Soil Data. HEL classifications were appended to SSURGO spatial data via an ARCEdit session. Addendum and publication dates vary by county.

11. Lands removed from production through farm bill programs. County enrollment derived from the following: CRP Acres: [www.fsa.usda.gov/crpstorpt/07Approved/r1sumyr/mn.htm](http://www.fsa.usda.gov/crpstorpt/07Approved/r1sumyr/mn.htm) (7/30/04). CREP Acres: <http://www.bwsr.state.mn.us/easements/crep/easementssummary.html> (7/31/03). WRP Acres: NRCS (8/16/04). Data were obtained by county and adjusted by percent of HUC in the county.

12. Socioeconomic and Agricultural Census Data were taken from the U.S. Population Census, 2000 and 2002 Agricultural Census and adjusted by percent of HUC in the county or by percent of zip code area in the HUC, depending on the level of data available. Data were also taken from MPCA AFO/CAFO counts provided by county for 2005.

13. 1997 NRI Estimates for sheet and rill erosion (WEQ & USLE). The NRI estimates sheet and rill erosion together using the Universal Soil Loss Equation (USLE). The Revised Universal Soil Loss Equation (RUSLE) was not used in the 1997 NRI. RUSLE was not available for previous inventories, therefore the use of USLE was continued to preserve the trending capacity of the NRI database. Wind erosion is estimated using the Wind Erosion Equation (WEQ). For further information visit <http://www.mn.nrcs.usda.gov/technical/nri/findings/erosion.htm>

14. Federally listed endangered and threatened species counts obtained from NRCS Field Office Technical Guide, Section II, Threatened and Endangered List. <http://www.nrcs.usda.gov/Technical/efotg/>. Where listed, Essential fish habitat as established by Magnuson-Stevens Fishery Conservation and Management Act, Public Law 94-265, as amended through October 11, 1996 <http://www.nmfs.noaa.gov/sfa/magact/>

15. Watershed Projects, Plans, Monitoring. Natural Resources Conservation Service, Watershed Projects Planned and Authorized, <http://www.nrcs.usda.gov/programs/watershed/Purpose>. Additional Information on listed individual projects can be obtained from the noted parties.